swelling of the wrist subsiding considerably under local and focal treatment. Vaginal smears were found to contain gonococci.

On the morning of June 25th the infant's eyes were seen to be very puffy and discharging; treatment was immediately begun, hourly irrigation and the instillation of argyrol drops 20 per cent. being undertaken twice daily. Smears from both eyes contained pus and numerous gonococci. The ophthalmia was moderately severe, and rather resistant to treatment. About a week later the left thumb became inflamed and swollen. On July 8th mother and child were seen at the auxiliary clinic. The mother was pale, and still had a little swelling around the right wrist, but all movements were free. The other joints appeared normal. There was a purulent discharge from the urethra and right Bartholinian gland. The cervix was lacerated and acutely inflamed, and there was a profuse discharge of pus from the endocervix. The uterus was well involuted, and the appendages seemed normal. Abundant gonococci were found in the smears. The gonococcal complement-fixation reaction of the blood was strongly positive, but the Wassermann reaction was negative. Local treatment was continued daily, and a course of detoxicated gonococcal vaccine was given. The arthritis of the wrist rapidly subsided, leaving no trace. On July 19th there was a little swelling around the right ankle, but no tenderness. This disappeared in the course of a few days without any local treatment.

On July 8th the infant's eyes showed only a very little discharge, and there was no reddening of the conjunctivae. The left thumb was swollen, shiny, and red, and generally spindle-shaped, the metacarpo-phalangeal articulation being affected. As before, no local treatment other than warmth was adopted, though treatment of the conjunctivitis was continued. The gonococcal complement-fixation reaction of the blood was reported negative. The acute inflammation of the joint abated very quickly, but the left thumb remained a little more swollen than the right for about a fortnight. On September 2nd the eyes were perfectly clear, and no clinical evidence remained of the arthritis. The infant's gonococcal complement-fixation reaction was, however, weakly positive. On December 2nd the child's general condition was excellent, and no trace of the illness could be found. The gonococcal complement-fixation reaction was negative. The mother made an equally good recovery, and has passed her third test of cure. She has had no further rheumatic symptoms.

Commentary

The interesting points about this case seem to be:

1. The joint affected was one of those more rarely attacked in ophthalmia neonatorum.
2. The early rupture of the membranes and the delay in labour are worth notice, since they probably account for the infection of the eyes in spite of the "prophylactic" treatment. Pechin⁶ has particularly referred to premature rupture of the membranes as a factor in the production of ante-partum gonorrhoeal infection of the infant's eyes. In this case gonococci were almost certainly present in the conjunctival sacs for some hours before birth, and might even have entered the blood stream.
3. It is also interesting to note that, while the mother's complement-fixation reaction was strongly positive, the infant's blood was negative when the arthritis was at its height. Later, when symptoms had completely subsided, the infant's reaction was found to be weakly positive. Is there any analogy here to the negative Wassermann reaction obtained in some very young infants whose blood is found two or three months later to be positive?

Summary

1. A short account is given of arthritis complicating gonococcal ophthalmia neonatorum.
2. A case is described where this occurred with gonococcal arthritis in the mother.
3. Some points of interest are noted.

My thanks are due to Dr. Thomas Evans, M.O.H., for permission to publish the case, and to Dr. Mary Marsh for the obstetrical notes.

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VINYL ETHER

A NEW METHOD OF ADMINISTRATION

BY

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Vinyl ether is an anaesthetic agent which has been proved to have certain well-defined indications. Anaesthetists who have to administer anaesthetics for dental and other short operations to large numbers of children, many under the age of 5 years, soon realize that nitrous oxide will only give 20 to 30 seconds' anaesthesia, unless the administration is pushed to an undesirably deep level. Ethyl chloride, although it produces a comparatively long anaesthesia (50 to 70 seconds), frequently causes vomiting and lassitude afterwards, and consequently the recovery room of a large clinic becomes crowded with children in various stages of recovery. The administration of nasal gas and oxygen, though ideal, is difficult, and frequently impossible of achievement in the reluctant child.

Vinyl ether produces anaesthesia rapidly, and, so far as our experience goes, recovery is prompt and without incident, particularly when the "closed method" here described is used. Therefore for these reasons vinyl ether has been employed in a considerable number of cases during the last six months in the Royal Free Hospital and the Eastman Dental Clinic.

Properties of Vinyl Ether

1. Vinyl ether, divinyl oxide, has the chemical formula $\text{CH}_2 : \text{CH} . \text{O} . \text{CH} : \text{CH}_2$.
2. It is a colourless liquid with a characteristic odour.
3. The boiling-point is $28.31^\circ \text{C}.$, and the specific gravity is 0.77.
4. It rapidly decomposes, and consequently has added to it 3.5 per cent. of alcohol and 0.01 per cent. of a non-volatile oxidation inhibitor (phenyl naphthylamine).
5. It is highly inflammable.

Action.—Vinyl ether is an inhalation anaesthetic, and probably derives its anaesthetic action from its lipid-soluble property, being rather more potent than chloroform. An overdose produces respiratory paralysis, but it does not appear to have any effect on the cardiovascular system in the small doses used in this method of administration. It is non-irritant to the lungs, but produces an increased flow of saliva.

Safety.—Spontaneous recovery following respiratory paralysis induced by an overdose of vinyl ether in rats occurred in 100 per cent. of cases when the anaesthetic was immediately withdrawn.

Elimination.—Vinyl ether is rapidly eliminated unchanged by way of the lungs with almost the same rapidity as nitrous oxide.

After-effects.—No undesirable after-effects have been observed. In this series of cases not a single patient has vomited or has been detained on account of any post-anaesthetic complication.

Portability.—Vinyl ether is obtainable under the trade name of "vinesthene," in bottles of 25 and 75 c.cm. ;

as, however, once opened the contents of the bottle rapidly decompose I suggested that ampoules would be more convenient. It can now be obtained in this form, each ampoule containing 3 c.cm.

Technique

After a considerable number of experiments a "closed" method was adopted, using a special inhaler, as by this method great economy of anaesthetic is effected and the resulting anaesthesia is more rapid and certain in its onset than by an open method.

Apparatus.—The inhaler is a modification of Ormsby's ether inhaler. It consists of a sponge container made of two metal tubes, one of which slides into the other; at

one end a mask may be fitted, and at the other a small rebreathing bag of thin rubber is attached. This sponge container is so made that it can readily be filled by revolving the outer tube a quarter of a turn, so that two apertures correspond. The mask end will fit on to the standard gas mask or the well-known McKesson mask. The whole container can be plugged on to a McKesson ether chamber or to the standard closed circuit now added to many gas-oxygen machines, and in this way can be used for giving vinyl ether as an adjuvant to gas-oxygen. The illustrations show the inhaler in parts and also fully assembled.

Administration

The patient is placed comfortably on the operating table or in the dental chair; for dental extractions a prop or Mason's gag is inserted in the mouth.

The end of an ampoule of 3 c.cm. of vinyl ether is sawn off and the contents shaken into the inhaler through the small funnel, which is then shut. The inhaler is now applied to the patient's face so that two expirations are caught in the bag, which becomes partially distended.

The mask is now firmly held on the face, so that to-and-fro breathing takes place. At first the breathing is irregular, but in 10 to 15 seconds breathing becomes more regular, and a child who had been screaming at the commencement is now silent. The breathing quickly changes to the "automatic" respiration of third-stage anaesthesia, but usually the eyelids remain open. The palpebral and conjunctival reflexes disappear and the eye becomes fixed, but there is little, if any, dilatation of the pupil. The patient's colour is slightly more flushed than normal, and for dental extractions the inhaler is now removed. The time taken to produce anaesthesia remains fairly constant, is generally about 55 seconds, and will last a further 40 to 60 seconds. About 60 seconds afterwards most patients will have so completely recovered

that even small children are able to leave the chair unaided and to walk into the recovery room.

For longer operations, when anaesthesia is complete the patient should be given a breath of air every ten respirations or so, and further quantities of vinyl ether may be added through the funnel as required.

On the other hand, it is easier to insert a Eustachian catheter under the mask, which is connected to an oxygen cylinder, delivering a very small flow of oxygen—about 1 litre per minute is usually sufficient.

Observations

In a series of 364 inductions no patient has yet vomited or complained of nausea. The patients have been of all ages ranging between 7 weeks and 50 years. Cyanosis has never been observed, and respiration has never ceased in any of these cases.

Many of the patients have been quite unprepared for operation, especially those attending the Eastman Dental Clinic, for until they are examined it is not known whether an anaesthetic is necessary. None of the cases

received any premedication. This series is made up of the following cases:

Dental cases ...	351
Paracentesis ...	1
Circumcisions ...	3
Painful dressings ...	3
Manipulations ...	1
Anal fissure ...	1
Tracheotomy ...	1
Abscesses, etc. ...	3

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Summary

1. Vinyl ether can be used as an anaesthetic for short cases in an unprepared patient without premedication.
2. The apparatus described is portable.
3. Accurate dosage of vinyl ether is not essential.
4. Recovery is always rapid and free from incident.

My thanks are due to Mr. Endicott and the staff of the Eastman Dental Clinic for their co-operation and patience during this investigation. Messrs. May and Baker have supplied the "vinesthene" gratuitously, and Messrs. A. C. King and Co. have faithfully carried out my requirements in making the inhaler.

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Clinical Memoranda

Congenital Atresia of the Small Intestine

While congenital atresia of the small intestine is not an extreme rarity, nevertheless such cases as do occur are very interesting as regards the pathological findings.

CASE HISTORY

A baby, aged 4 days, was admitted to hospital on November 29th, 1935, with the tentative diagnosis of congenital pyloric stenosis. Labour had been normal; the baby weighed 7 lb., and was well nourished. No meconium was passed at birth or in the succeeding days prior to admission to hospital. Vomiting began early on the second day of life; the vomit was at first greenish, later becoming greenish brown. Vomiting persisted; the child was fretful and evidently in some pain. Constipation was absolute.

On examination there were no signs of dehydration. The child cried incessantly. No visible peristalsis was evident; the upper part of the abdomen was uniformly distended; no tumour was palpable in the abdomen. Rectal examination showed no degree of imperforate anus. A soft rubber catheter passed freely into the rectum; on withdrawal there was no meconium on the tube. No flatus was passed while the tube was in the rectum. A sterile feed (one ounce) was vomited back after half an hour.

On opening the abdomen distended small intestine was seen. There was no pyloric stenosis. The distended bowel was traced downwards till it was found to end in a dilated bulbous portion, from which a thin fibrous cord was seen to arise. The colon was collapsed, as was the remainder of the ileum distal to the stricture. Enterostomy was performed.

The child died suddenly about fourteen hours after operation. No further vomiting had occurred, but blood-stained fluid had drained freely from the enterostomy tube.

NECROPSY REPORT

The stomach was found to be normal in size and shape; the pylorus was normal. The distended coils of small intestine

measured three and a half feet from the pylorus; the fibrous cord was found to terminate in the region of a mass of small lymph glands situated in the mesentery. Turning to the collapsed distal portion of small intestine a similar fibrous cord, continuous with the collapsed distal portion of the ileum, was traced into the same collection of lymph glands. No anatomical continuity could be demonstrated between these two cords, although they were probably part of the same bowel remnant in attenuated form. The remainder of ileum and colon was normal; the colon had fully rotated. The appendix was abnormally long, measuring four inches in length. The other organs were normal, no other congenital abnormalities being found.

- 1, Dilated stomach. 2, Dilated proximal part of small intestine. 3, Bulbous termination, with enterostomy tube. 4, Attenuated cord, representing continuation of bowel, leaving proximal portion of bowel. 5, Attenuated cord, entering normal ileum. 6, Collapsed ileum, distal to atresia. 7, Appendix, four inches long. 8, Colon, normal in structure, but collapsed. 9, Mass of lymph glands lying in mesentery, with adherent intestine.

COMMENTARY

Congenital atresia of the small intestine is comparatively rare; forty cases have been recorded in the medical literature in the last ten years.¹ The site of the atresia and its extent vary. Stenosis occurs frequently in the duodenum in relation to the opening of the bile duct, but more commonly atresia may occur high up in the jejunum; it is also met with in the ileum, especially in relation to Meckel's diverticulum. As a rule the atresia is found either high up in the jejunum or low down in the ileum.² The extent of the atresia varies from a local narrowing of the lumen to complete obliteration: a segment of the intestine may be entirely absent, as in this case, or the defect may only involve an inch or so of the bowel. Again, the atresia may be multiple, and cases have been recorded where atresia of different parts of the intestine (for example, jejunum, ileum, and rectum³) or of the same part (for example, ileum⁴) have coexisted. Errors of rotation of the intestine may be associated with this condition.⁵ Acute intestinal obstruction due to atresia has been associated with volvulus of the bowel above. The diagnosis is simply that of intestinal obstruction in the newborn. It has to be differentiated from other forms of obstruction, such as congenital pyloric stenosis, atresia of rectum, imperforate anus, and imperforate oesophagus. The prognosis is bad, although recovery after operation is not unknown.⁶

The various points mentioned in the post-mortem findings are shown in the accompanying illustration. I am indebted to Mr. A. H. Southam of Manchester Royal Infirmary for permission to publish this case.

Stockport.

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